

REMARKS

Claims 17-19 and 27-31 have been amended to make them dependent from the active claims. No new matter has been added. Upon entry of this amendment, claims 1-13, 17-24 and 27-31 are present and active in the application.

C/C composites are considerably stronger and lighter than steel. Such materials increase in strength with increasing heat treatment and resist thermal shock caused by rapid temperature change. However, they suffer from a number of drawbacks including poor oxidation resistance, highly variable wear rates and coefficient of friction, and costly manufacturing. Carbon fibers reinforcing a boron nitride matrix (C/BN composites) have the potential to overcome some of the shortcomings of C/C composites. Prior preparations of these composites, such as those described in U.S. Pat. No. 5,399,377, do not have acceptable heat capacity and thermal conductivity to substitute for C/C composites in aircraft brakes, due to low density. The present invention mitigates this problem.

The present invention includes forming a mixture comprising borazine oligomer, and subjecting the mixture to a first heating. The first heating is at 60 °C to 80 °C, and at a pressure of at least 0.5 MPa. The composite material has a boron nitride matrix with superior density, providing a composite with superior properties.

The rejections of the claims under 35 U.S.C. 102 over Economy et al., and under 35 U.S.C. 103 over Economy et al. alone, and in combination with Lavasserie et al., and Parlier et al., are respectfully traversed. Economy et al. does not apply pressure during the first heating at 50-90 °C.

Economy et al. describe borazine oligomer and boron nitride composite materials. Borazine oligomer is prepared by heating borazine at 70 °C (col. 3, lines 13-15). The preparation of the composites is only described in the examples: the oligomeric precursor is impregnated into a fiber bundle, and then the matrix is partially stabilized in shape through further polymerization in temperature ranges of 50 °C to 90 °C for two days under a nitrogen atmosphere in an oven (col. 4, lines 24-35). Next, thermal processing is conducted under non-oxidative crosslinking conditions to a final temperature of 400 °C supplied by a Carver hot-press, with molding pressures gradually applied up to 5 ksi (col. 4, lines 38-45). There is no suggestion to apply pressure during

the first heating at 50 °C to 90 °C – this heating is carried out in an oven under a nitrogen atmosphere.

Lavasserie et al. and Parlier et al. have been cited for elements of dependent claims. These references do not suggest applying pressure during the first heating at 50 °C to 90 °C.

The claimed invention includes a first heating at 60 °C to 80 °C, and at a pressure of at least 0.5 MPa. Economy et al. have a first heating at 50 °C to 90 °C for two days under a nitrogen atmosphere in an oven. No pressure is applied during this first heating. Only the second heating, carried out in a hot-press, applies pressure. Lavasserie et al. and Parlier et al. have been cited for elements of dependent claims. Accordingly, applicants submit that the claimed invention is neither anticipated by, nor obvious over, the applied references. Withdrawal of these grounds of rejection is respectfully requested.

The rejection of the claims under 35 U.S.C. 112, second paragraph, is respectfully traversed. The phrase “the greatest pressure of the second heating is at least” indicates a minimum pressure that must be attained at some point during the second heating. Withdrawal of this ground of rejection is respectfully requested.

The objection to the Abstract has been obviated by appropriate amendment.

Applicants submit that the present application is now in condition for allowance. Early notice of such action is earnestly solicited.

Respectfully submitted,



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